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(71) Applicants:
• **HIROSE ELECTRIC CO., LTD.**
Shinagawa-ku Tokyo (JP)
• **NOKIA MOBILE PHONES LTD.**
24101 Salo (FI)

• **Kobayashi, Hiroyuki, c/o Hirose Electric Co., Ltd.**
Shinagawa-ku, Tokyo (JP)
• **Hellgren, Matti, c/o Nokia Mobile Phones Ltd.**
Salo, 24101 (FI)

(74) Representative: **Coyle, Philip Aidan et al**
F. R. KELLY & CO.
27 Clyde Road
Ballsbridge
Dublin 4 (IE)

(72) Inventors:
• **Suzuki, Akio, c/o Hirose Electric Co., Ltd.**
Shinagawa-ku, Tokyo (JP)

(54) **Portable phone composite connector**

(57) A portable phone composite connector includes a housing (2) with a connection recess (3) having a rectangular opening on a front surface (2A) thereof which is substantially flush with a surface (B1) of a portable phone. A flat connector (4) is provided within the connection recess and comprises an insulation plate bearing signal terminals (4A). An RF terminal (5) is provided within the connection recess adjacent to the flat connectors and a reinforcing member (6) is provided for reinforcing a major wall (3A) of the connection recess.

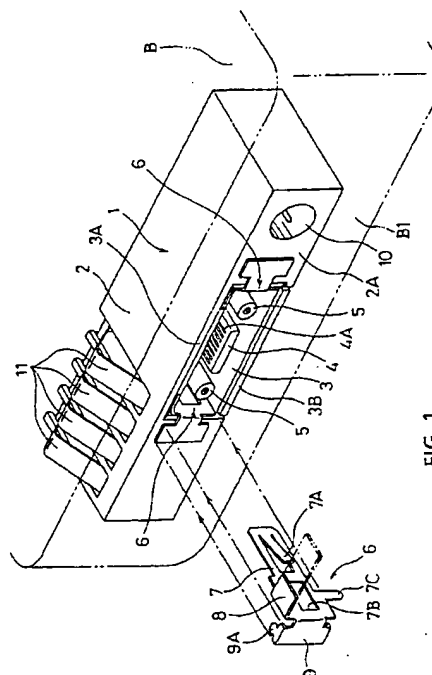


FIG. 1

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Description

The invention relates to portable phone composite connectors.

Japanese Patent Application Kokai No. 5-21112 discloses a composite connector such as shown in Fig. 4. The composite connector 51 is provided within a body B of a compact and thin portable phone such that the front surface 51A of the composite connector 51 is flush with a front surface B1 of the body B to receive a mating plug P.

A connection recess 52 extends rearwardly from the front surface 51A. A flat connector 53 having signal terminals and an RF terminal 54 are disposed within the connection recess 52. Battery terminals 55 are provided on the top of the composite connector 51. A turnover switch 56 is provided on the rear face of the composite connector 51.

When the portable phone is used by itself, power is supplied from a battery (not shown) through the battery terminals. When used in a car, the plug P is connected to the composite connector 51 while the turnover switch 56 is used so that power is supplied from the car battery through the plug P to the flat connector 53 while the car antenna is connected to the RF terminal 54.

The portable phone is made thin for easy handling so that the composite connector must be thin. Because of the presence of the flat connector 53 and the RF terminal 54, the upper and lower walls of the connection recess are very thin and fragile.

Accordingly, it is the primary object of the invention to provide a construction of portable phone composite connector in which this disadvantage is mitigated.

This object is achieved by the invention claimed in Claim 1.

Further, in order to provide the portable phone with rechargeable battery, it is necessary to provide power terminals 57 as shown by phantom line for contact with a charger, increasing the size of the portable phone.

Accordingly, it is a subsidiary object of the invention to provide a portable phone composite connector which is thin but strong and has power terminals for charging without increasing the connector site.

This object is claimed in the preferred embodiment by the feature claimed in Claim 3.

It is preferred that the reinforcing section is made by bending a metallic sheet in an L-shape so as to extend down the sides of the connection recess and along the major surface of the connection recess.

Also, the reinforcing member may be provided with terminals for charging an internal re-chargeable battery of the phone with a stand type charger. The power terminals are preferably made by bending the front end portions of the reinforcing member to form integrated power terminals thereby eliminating the need for providing separate power terminals. A DC jack may be provided in the front surface of the housing for connection to a household adaptor so as to provide a compact com-

posite connector adapted to work with a variety of power sources.

Embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of a portable phone composite connector according to an embodiment of the invention;

Fig. 2 is a perspective view of a portable phone employing the composite connector;

Fig. 3 is a perspective view of a reinforcing frame for the composite connector; and

Fig. 4 (previously described) is a perspective view of a conventional composite connector

In Fig. 1, a composite connector 1 is provided within a body B of a portable phone. A housing 2 of the composite connector 1 has a connection recess 3 extending rearwardly from a front surface 2A. The front surface 2A is flush with a surface B1 of the body B.

The connection recess 3 has a shape and size suitable for receiving a mating plug such as shown in Fig. 4. In this embodiment, the connection recess 3 has a rectangular front shape. A flat connector 4 and a pair of RF terminals 5 (coaxial connectors for radio frequencies) are arranged within the connection recess 3. The flat connector 4 is made up of an insulation plate and signal terminals 4A arranged on upper and lower surfaces of the insulation plate. The RF terminals 5 are disposed on opposite sides of the flat connector 4.

A pair of metallic reinforcing members 6 are provided on opposite sides of the connection recess 3 to not only reinforce the thin upper wall 3A of the connection recess 3 but also serve as power terminals for recharging by means of a stand type charger. The reinforcing member 6 is made up mainly of an insertion guide 7, a reinforcing section 8, and a terminal section 9 extending in mutually perpendicular planes. The reinforcing section 8 extends laterally from the insertion guide 7 so as to contact the upper wall 3A of the connection recess 3 while the terminal section 9 extends laterally from the insertion guide 7 so as to extend along the front surface 2A of the housing 2. The reinforcing section 8 may be extended as shown by phantom line in Fig. 1 to enhance the degree of reinforcement. A lower reinforcing section may also be provided to reinforce a lower wall 3B of the connection recess 3.

The insertion guide 7 has a latch tongue 7A for engaging an engaging section (not shown) of the housing 2 to prevent the member 6 falling out, a locking aperture 7B for engaging a locking section of the mating plug, and a fixing leg 7C for mounting on a circuit board within the body B. A pair of latch tabs 9A extend rearwardly from opposite ends of the terminal section 9 to be inserted into engaging slits (not shown) of the housing 2 for securing close contact between the terminal section 9 and the front surface 2A.

A DC jack 10 is also provided in the composite connector 1 so as to open on the front surface 2A of the housing 2. The DC jack 10 is conventional to permit power to be supplied through an adaptor (not shown).

Battery terminals 11 project diagonally upwardly through the upper left side wall of the housing 2 for contact with a battery within the body B.

In use the reinforcing members 6 are inserted into the housing 1. The reinforcing sections 8 extend along the upper wall 3A of the connection recess 3 for reinforcing the thin upper wall 3A.

When no external power source is used, power is supplied from the internal battery through the battery terminals 11. When household electric power is used, the DC jack 10 is used in place of the battery.

In the case of mobile phones, a plug such as shown in Fig. 4 is connected to the connection recess 3.

As shown in Fig. 2, when the battery is charged with a stand type charger 21, the portable phone is put in the receiving recess 22 of the charger 21 which is connected to household electric power through an adaptor 20. The terminals 9 of the reinforcing members 6 are brought into contact with contact pads 23 of the charger 21 for charging.

In Fig. 3, a single metallic reinforcing member 30 according to another embodiment of the invention is shown. A reinforcing section 31 extends the entire width of the upper wall 3A of the connection recess 3 to increase the degree of reinforcement. A lower reinforcing section 32 may be provided as shown by phantom line to reinforce the lower wall 3B. For non-rechargeable models, no power terminals are provided.

Since the reinforcing members are inserted in the connection recess to reinforce the upper and/or lower wall of the connection recess, the connector housing can be thin and strong. In the embodiment of Fig. 1, the terminal sections of the reinforcing member eliminate the need for separate battery terminals thus making the portable phone compact and simple in structure. The DC jack makes the charging mechanism simple and the portable phone compact and simple in assembling work.

2. A portable phone composite connector according to claim 1, wherein the reinforcing means comprises a reinforcing section extending along the major wall of the connection recess.
3. A portable phone composite connector according to claim 1 or 2, wherein the reinforcing means comprises terminal sections extending along the front surface of the housing for contact with a power source for charging an internal re-chargeable battery of the phone.
4. A portable phone composite connector according to claim 1, 2 or 3, further comprising a DC jack extending rearwardly from the front surface of the housing.

Claims

1. A portable phone composite connector, comprising:

a housing with a connection recess having a substantially rectangular opening on a front surface thereof which is substantially flush with a surface of a portable phone;
a flat connector provided within the connection recess and comprising an insulation plate bearing signal terminals;
an RF terminal provided within the connection recess adjacent to the flat connector; and
reinforcing means for reinforcing a major wall of the connection recess.

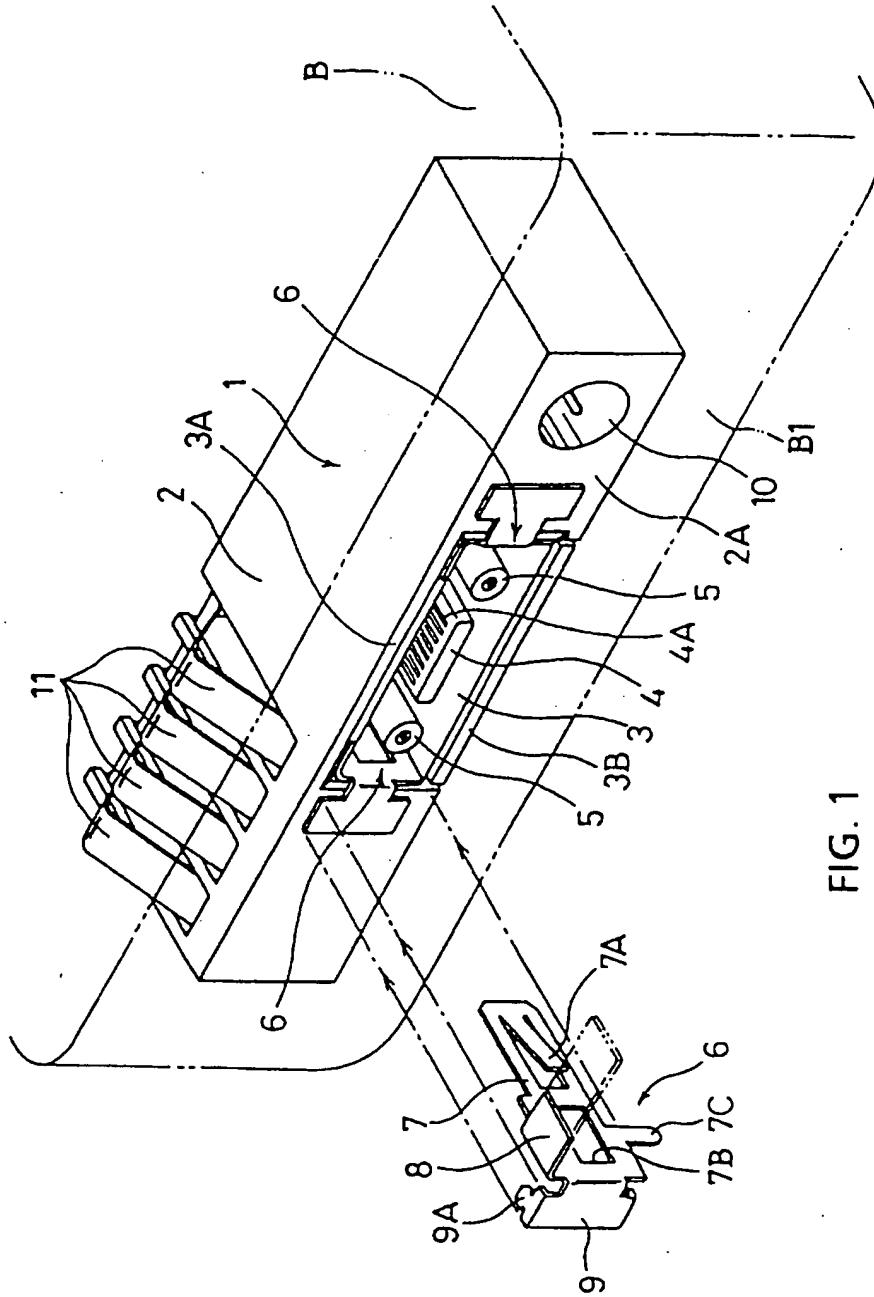


FIG. 1

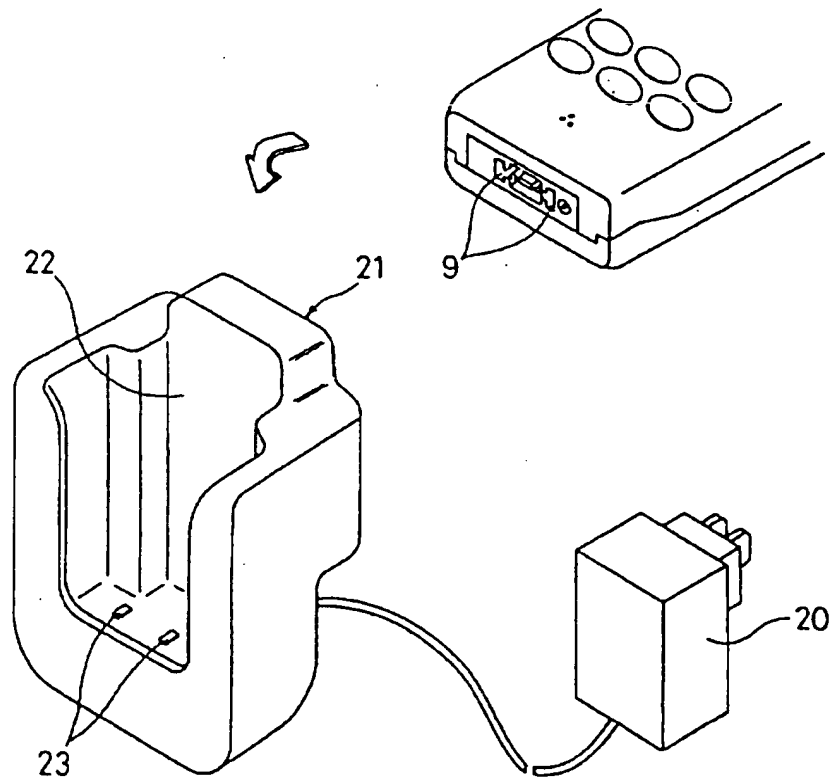


FIG. 2

